



OM-154 501S

March 1999

Processes



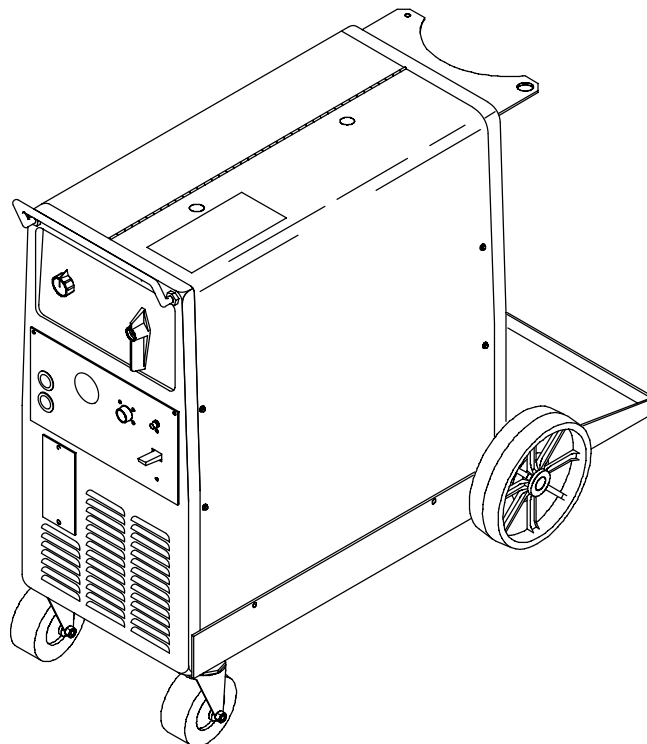
Gas Metal Arc (MIG) Welding
Flux Cored Arc (FCAW)
Welding

Description



Arc Welding Power Source And Wire
Feeder

MW250



For Warranty Claims And Technical Support, Contact:
Milweld Inc., National Distributor
P.O. Box 338, Hortonville, WI 54944-0338
Tel 920-779-0916 Fax 920-779-0924

OWNER'S MANUAL

The following term is used interchangeably throughout this manual:
MIG=GTAW

WARNING

This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)

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SECTION 1 – SAFETY PRECAUTIONS - READ BEFORE USING

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1-1. Symbol Usage



Means Warning! Watch Out! There are possible hazards with this procedure! The possible hazards are shown in the adjoining symbols.

▲ Marks a special safety message.

☞ Means "Note"; not safety related.



This group of symbols means Warning! Watch Out! possible ELECTRIC SHOCK, MOVING PARTS, and HOT PARTS hazards. Consult symbols and related instructions below for necessary actions to avoid the hazards.

1-2. Arc Welding Hazards

▲ The symbols shown below are used throughout this manual to call attention to and identify possible hazards. When you see the symbol, watch out, and follow the related instructions to avoid the hazard. The safety information given below is only a summary of the more complete safety information found in the Safety Standards listed in Section 1-4. Read and follow all Safety Standards.

▲ Only qualified persons should install, operate, maintain, and repair this unit.

▲ During operation, keep everybody, especially children, away.



ELECTRIC SHOCK can kill.

Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input power circuit and machine internal circuits are also

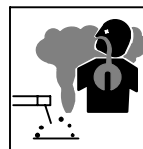
live when power is on. In semiautomatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.

- Do not touch live electrical parts.
- Wear dry, hole-free insulating gloves and body protection.
- Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work or ground.
- Do not use AC output in damp areas, if movement is confined, or if there is a danger of falling.
- Use AC output ONLY if required for the welding process.
- If AC output is required, use remote output control if present on unit.
- Disconnect input power or stop engine before installing or servicing this equipment. Lockout/tagout input power according to OSHA 29 CFR 1910.147 (see Safety Standards).
- Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes.
- Always verify the supply ground – check and be sure that input power cord ground wire is properly connected to ground terminal in disconnect box or that cord plug is connected to a properly grounded receptacle outlet.
- When making input connections, attach proper grounding conductor first – double-check connections.
- Frequently inspect input power cord for damage or bare wiring – replace cord immediately if damaged – bare wiring can kill.
- Turn off all equipment when not in use.
- Do not use worn, damaged, undersized, or poorly spliced cables.
- Do not drape cables over your body.

- If earth grounding of the workpiece is required, ground it directly with a separate cable – do not use work clamp or work cable.
- Do not touch electrode if you are in contact with the work, ground, or another electrode from a different machine.
- Use only well-maintained equipment. Repair or replace damaged parts at once. Maintain unit according to manual.
- Wear a safety harness if working above floor level.
- Keep all panels and covers securely in place.
- Clamp work cable with good metal-to-metal contact to workpiece or worktable as near the weld as practical.
- Insulate work clamp when not connected to workpiece to prevent contact with any metal object.
- Do not connect more than one electrode or work cable to any single weld output terminal.

SIGNIFICANT DC VOLTAGE exists after removal of input power on inverters.

- Turn Off inverter, disconnect input power, and discharge input capacitors according to instructions in Maintenance Section before touching any parts.



FUMES AND GASES can be hazardous.

Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

- Keep your head out of the fumes. Do not breathe the fumes.
- If inside, ventilate the area and/or use exhaust at the arc to remove welding fumes and gases.
- If ventilation is poor, use an approved air-supplied respirator.
- Read the Material Safety Data Sheets (MSDSs) and the manufacturer's instructions for metals, consumables, coatings, cleaners, and degreasers.
- Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Always have a trained watch-person nearby. Welding fumes and gases can displace air and lower the oxygen level causing injury or death. Be sure the breathing air is safe.
- Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
- Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and if necessary, while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.



ARC RAYS can burn eyes and skin.

Arc rays from the welding process produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin. Sparks fly off from the weld.

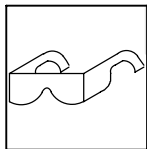
- Wear a welding helmet fitted with a proper shade of filter to protect your face and eyes when welding or watching (see ANSI Z49.1 and Z87.1 listed in Safety Standards).
- Wear approved safety glasses with side shields under your helmet.
- Use protective screens or barriers to protect others from flash and glare; warn others not to watch the arc.
- Wear protective clothing made from durable, flame-resistant material (leather and wool) and foot protection.



WELDING can cause fire or explosion.

Welding on closed containers, such as tanks, drums, or pipes, can cause them to blow up. Sparks can fly off from the welding arc. The flying sparks, hot workpiece, and hot equipment can cause fires and burns. Accidental contact of electrode to metal objects can cause sparks, explosion, overheating, or fire. Check and be sure the area is safe before doing any welding.

- Protect yourself and others from flying sparks and hot metal.
- Do not weld where flying sparks can strike flammable material.
- Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers.
- Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.
- Watch for fire, and keep a fire extinguisher nearby.
- Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
- Do not weld on closed containers such as tanks, drums, or pipes, unless they are properly prepared according to AWS F4.1 (see Safety Standards).
- Connect work cable to the work as close to the welding area as practical to prevent welding current from traveling long, possibly unknown paths and causing electric shock and fire hazards.
- Do not use welder to thaw frozen pipes.
- Remove stick electrode from holder or cut off welding wire at contact tip when not in use.
- Wear oil-free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.
- Remove any combustibles, such as a butane lighter or matches, from your person before doing any welding.



FLYING METAL can injure eyes.

- Welding, chipping, wire brushing, and grinding cause sparks and flying metal. As welds cool, they can throw off slag.
- Wear approved safety glasses with side shields even under your welding helmet.



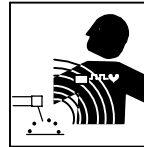
BUILDUP OF GAS can injure or kill.

- Shut off shielding gas supply when not in use.
- Always ventilate confined spaces or use approved air-supplied respirator.



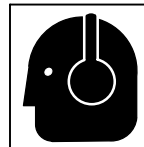
HOT PARTS can cause severe burns.

- Do not touch hot parts bare handed.
- Allow cooling period before working on gun or torch.



MAGNETIC FIELDS can affect pacemakers.

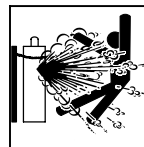
- Pacemaker wearers keep away.
- Wearers should consult their doctor before going near arc welding, gouging, or spot welding operations.



NOISE can damage hearing.

Noise from some processes or equipment can damage hearing.

- Wear approved ear protection if noise level is high.



CYLINDERS can explode if damaged.

Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.

- Protect compressed gas cylinders from excessive heat, mechanical shocks, slag, open flames, sparks, and arcs.
- Install cylinders in an upright position by securing to a stationary support or cylinder rack to prevent falling or tipping.
- Keep cylinders away from any welding or other electrical circuits.
- Never drape a welding torch over a gas cylinder.
- Never allow a welding electrode to touch any cylinder.
- Never weld on a pressurized cylinder – explosion will result.
- Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
- Turn face away from valve outlet when opening cylinder valve.
- Keep protective cap in place over valve except when cylinder is in use or connected for use.
- Read and follow instructions on compressed gas cylinders, associated equipment, and CGA publication P-1 listed in Safety Standards.

1-3. Additional Symbols For Installation, Operation, And Maintenance



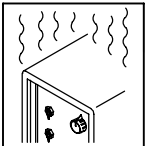
FIRE OR EXPLOSION hazard.

- Do not install or place unit on, over, or near combustible surfaces.
- Do not install unit near flammables.
- Do not overload building wiring – be sure power supply system is properly sized, rated, and protected to handle this unit.



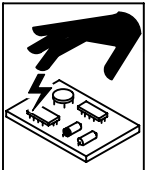
FALLING UNIT can cause injury.

- Use lifting eye to lift unit only, NOT running gear, gas cylinders, or any other accessories.
- Use equipment of adequate capacity to lift and support unit.
- If using lift forks to move unit, be sure forks are long enough to extend beyond opposite side of unit.



OVERUSE can cause OVERHEATING

- Allow cooling period; follow rated duty cycle.
- Reduce current or reduce duty cycle before starting to weld again.
- Do not block or filter airflow to unit.



STATIC (ESD) can damage PC boards.

- Put on grounded wrist strap BEFORE handling boards or parts.
- Use proper static-proof bags and boxes to store, move, or ship PC boards.



MOVING PARTS can cause injury.

- Keep away from moving parts.
- Keep away from pinch points such as drive rolls.



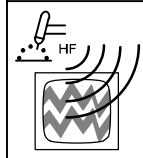
WELDING WIRE can cause injury.

- Do not press gun trigger until instructed to do so.
- Do not point gun toward any part of the body, other people, or any metal when threading welding wire.



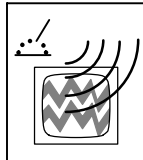
MOVING PARTS can cause injury.

- Keep away from moving parts such as fans.
- Keep all doors, panels, covers, and guards closed and securely in place.



H.F. RADIATION can cause interference.

- High-frequency (H.F.) can interfere with radio navigation, safety services, computers, and communications equipment.
- Have only qualified persons familiar with electronic equipment perform this installation.
- The user is responsible for having a qualified electrician promptly correct any interference problem resulting from the installation.
- If notified by the FCC about interference, stop using the equipment at once.
- Have the installation regularly checked and maintained.
- Keep high-frequency source doors and panels tightly shut, keep spark gaps at correct setting, and use grounding and shielding to minimize the possibility of interference.



ARC WELDING can cause interference.

- Electromagnetic energy can interfere with sensitive electronic equipment such as computers and computer-driven equipment such as robots.
- Be sure all equipment in the welding area is electromagnetically compatible.
- To reduce possible interference, keep weld cables as short as possible, close together, and down low, such as on the floor.
- Locate welding operation 100 meters from any sensitive electronic equipment.
- Be sure this welding machine is installed and grounded according to this manual.
- If interference still occurs, the user must take extra measures such as moving the welding machine, using shielded cables, using line filters, or shielding the work area.

1-4. Principal Safety Standards

Safety in Welding and Cutting, ANSI Standard Z49.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami FL 33126

Safety and Health Standards, OSHA 29 CFR 1910, from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Recommended Safe Practices for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, American Welding Society Standard AWS F4.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126

National Electrical Code, NFPA Standard 70, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, from Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.

Code for Safety in Welding and Cutting, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3.

Safe Practices For Occupation And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute, 1430 Broadway, New York, NY 10018.

Cutting And Welding Processes, NFPA Standard 51B, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

1-5. EMF Information

Considerations About Welding And The Effects Of Low Frequency Electric And Magnetic Fields

Welding current, as it flows through welding cables, will cause electromagnetic fields. There has been and still is some concern about such fields. However, after examining more than 500 studies spanning 17 years of research, a special blue ribbon committee of the National Research Council concluded that: "The body of evidence, in the committee's judgment, has not demonstrated that exposure to power-frequency electric and magnetic fields is a human-health hazard." However, studies are still going forth and evidence continues to be examined. Until the final conclusions of the research are reached, you may wish to minimize your exposure to electromagnetic fields when welding or cutting.

To reduce magnetic fields in the workplace, use the following procedures:

1. Keep cables close together by twisting or taping them.
2. Arrange cables to one side and away from the operator.
3. Do not coil or drape cables around your body.
4. Keep welding power source and cables as far away from operator as practical.
5. Connect work clamp to workpiece as close to the weld as possible.

About Pacemakers:

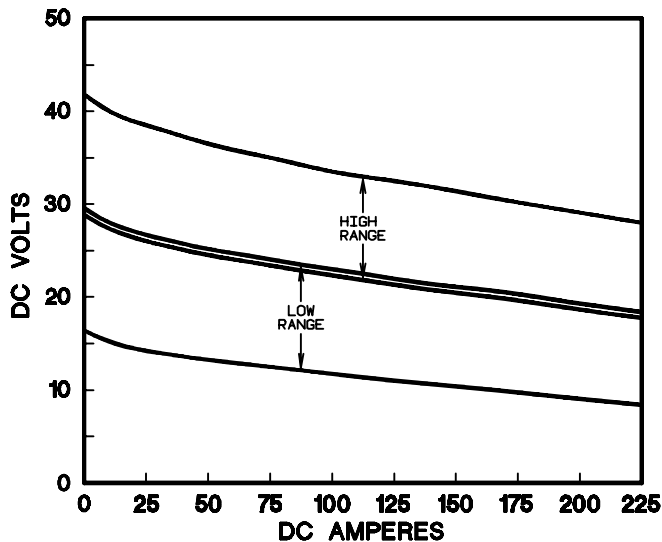
Pacemaker wearers consult your doctor first. If cleared by your doctor, then following the above procedures is recommended.

SECTION 2 – SPECIFICATIONS

2-1. Specifications

Specifications	Description
Type Of Output	Direct Current/Constant Voltage (DC/CV)
Rated Weld Output	200 Amperes, 28 Volts DC, 60% Duty Cycle (See Section 2-2)
Type Of Input Power	Single-Phase; 60 Hz; At 200 Or 230 Volts AC
Input Amperes At Rated Output	46 A At 200 V, 40 A At 230 V
Maximum Input Amperes While Idling	1.2 A At 200 V, 1 A At 230 V
KVA/KW Used At Rated Output	9.5 kVA/8.3 kW
Maximum KVA/KW Used While Idling	0.24 kVA/0.17 kW
Max. Open-Circuit Voltage	42 Volts DC
Control Circuit Voltage At Gun	24 Volts DC
Welding Processes	Gas Metal Arc (GMAW) And Flux Cored Arc Welding (FCAW)
Calculated Speed Range At No Load	128 To 1051 ipm (3.2 To 266.9 mpm)
Wire Diameter Range	.030 To .045 in (0.8 To 1.1 mm) Flux Cored Wire, .023 To .045 in (0.6 To 1.1 mm) Hard Wire
Overall Dimensions	Length: 37 in (940 mm); Width: 19 in (483 mm); Height: 30-1/4 in (768 mm)
Weight	Net: 225 lb (102 kg); Ship: 271 lb (123 kg)
Welding Gun	
Rated Output (Air Cooled)	200 Amperes At 60% Duty Cycle Using CO ₂ Shielding Gas (See Section 2-2)
Cable Length	15 ft (4.5 m)

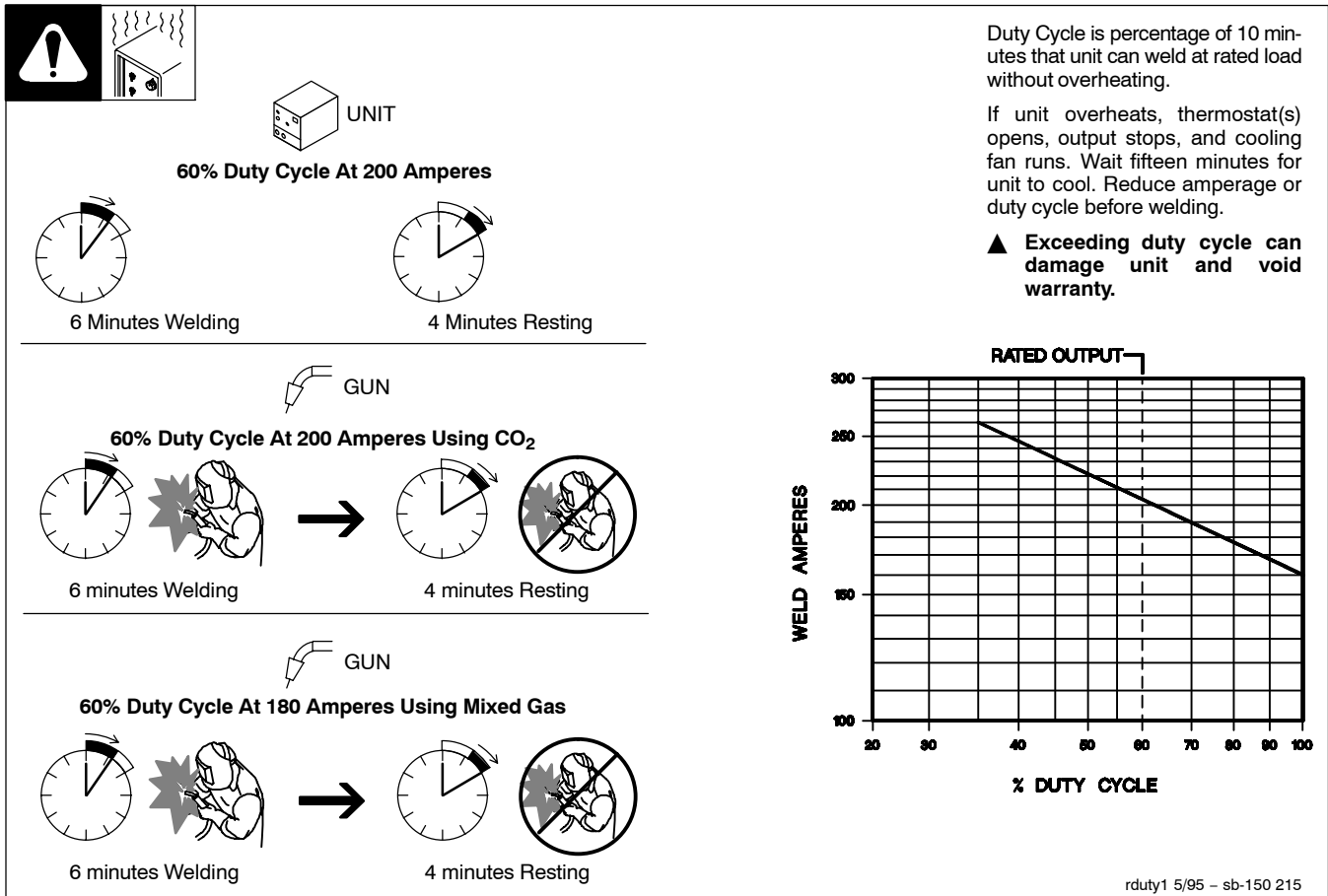
2-1. Volt-Ampere Curves



Volt-ampere curves show minimum and maximum voltage and amperage output capabilities of unit. Curves of other settings fall between curves shown.

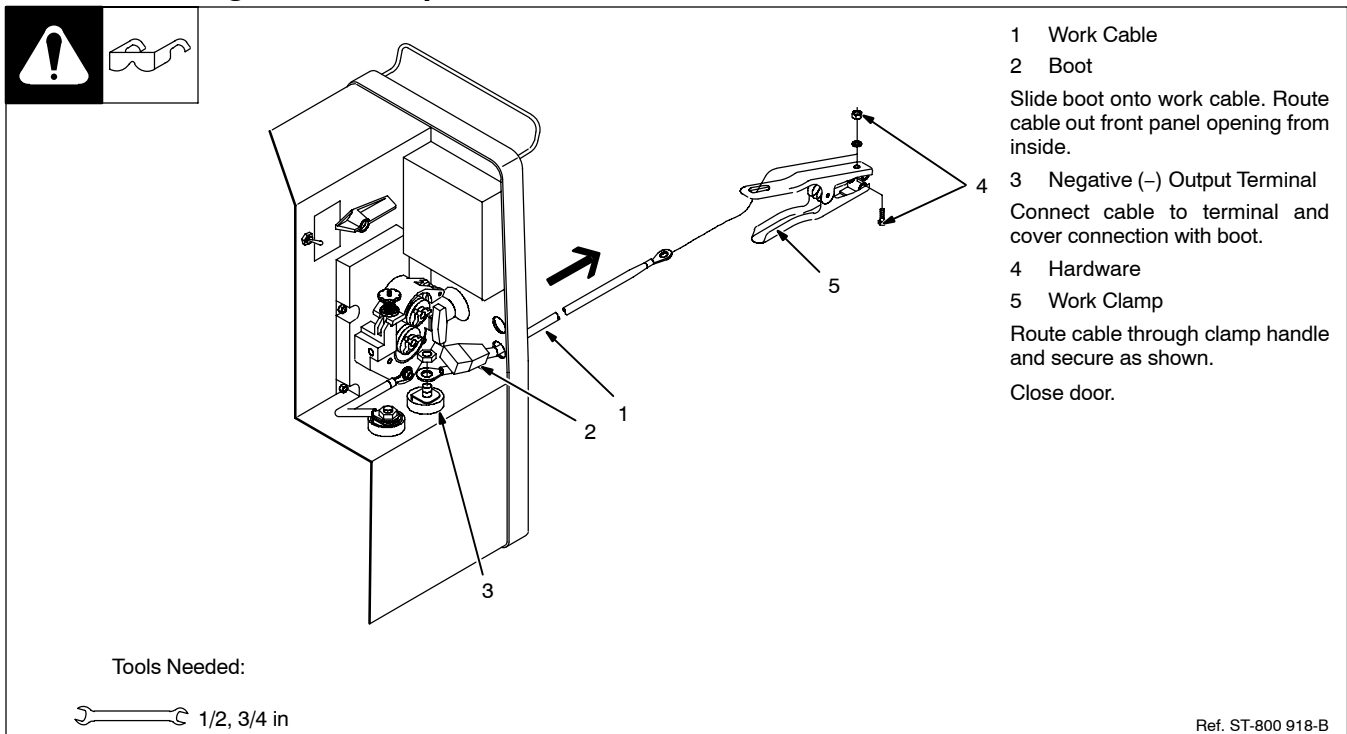
va_curve1 - 4/95 - SB-049 424-D

2-2. Duty Cycle And Overheating

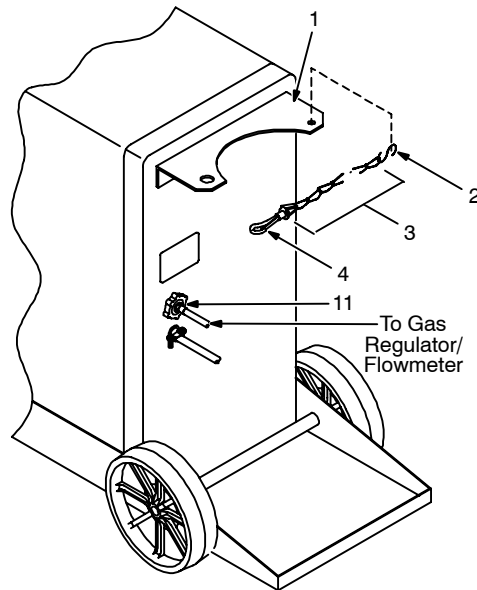


SECTION 3 – INSTALLATION

3-1. Installing Work Clamp



3-2. Installing Gas Supply



1 Cylinder Bracket

2 S-Hook

Crimp between small hole in bracket and chain.

3 Chain

4 Snap

Crimp onto open end of chain.

Obtain gas cylinder and chain to running gear.

5 Cap

6 Cylinder Valve

Remove cap, stand to side of valve, and open valve slightly. Gas flow blows dust and dirt from valve. Close valve.

7 Cylinder

8 Regulator/Flowmeter

Install so face is vertical.

9 Gas Hose Connection

Fitting has 5/8-18 right-hand threads. Obtain and install gas hose.

10 Flow Adjust

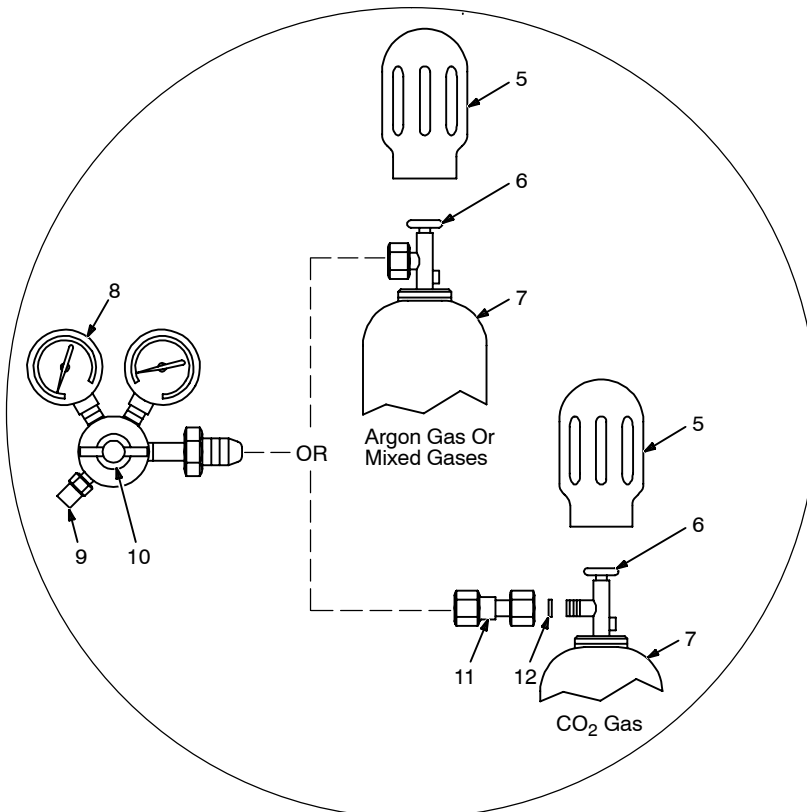
Typical flow rate is 20 cfh (cubic feet per hour). Check wire manufacturer's recommended flow rate.

Make sure flow adjust is closed when opening cylinder to avoid damage to the flowmeter.

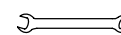
11 CO₂ Adapter

12 O-Ring

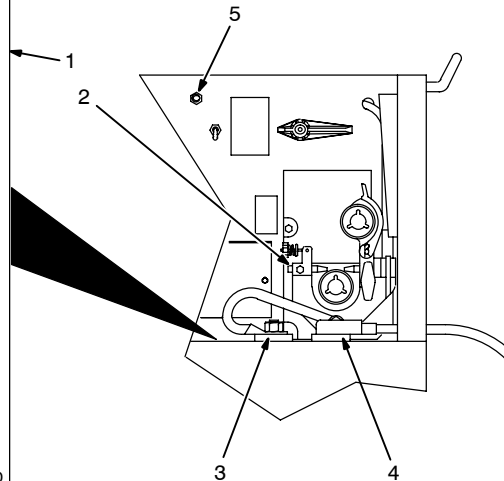
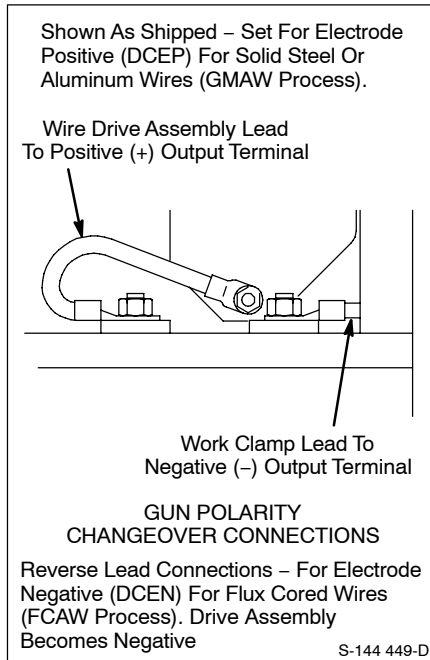
Install adapter with O-ring between regulator/flowmeter and CO₂ cylinder.



Tools Needed:

 5/8, 1-1/8 in

3-3. Gun Polarity Connections



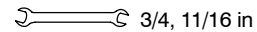
- 1 Polarity Changeover Label
- 2 Wire Drive Assembly
- 3 Positive (+) Output Terminal
- 4 Negative (-) Output Terminal

Always read and follow wire manufacturer's recommended polarity.

- 5 Circuit Breaker CB1 (see Section 5-2).

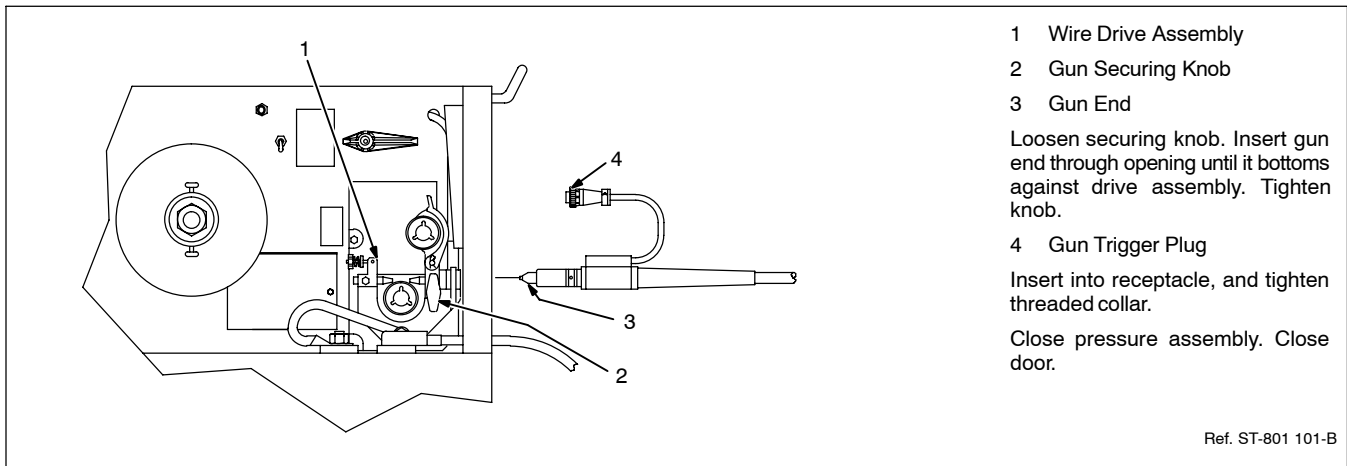
Close door.

Tools Needed:



Ref. ST-801 103-B

3-4. Installing Welding Gun



3-5. Electrical Service Requirements

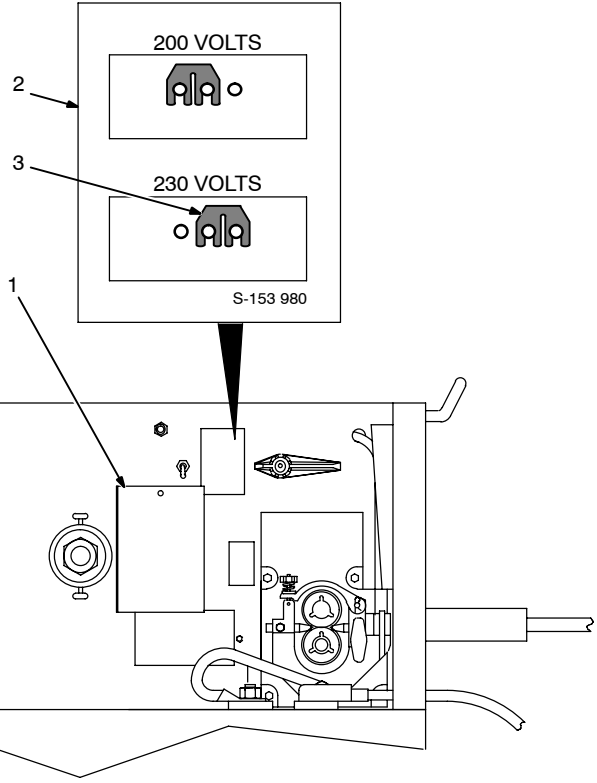
Input Voltage	200	230
Input Amperes At Rated Output	46	40
Max Recommended Standard Fuse Or Circuit Breaker Rating In Amperes	70	60
Min Input Conductor Size In AWG/Kcmil	8	8
Max Recommended Input Conductor Length In Feet (Meters)	89 (27)	117 (36)
Min Grounding Conductor Size In AWG/Kcmil	8	10

Reference: 1996 National Electrical Code (NEC).

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3-6. Positioning Jumper Links





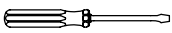
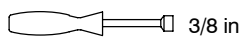
Check input voltage available at site.

1 Jumper Links Access Door
Open door.

2 Jumper Link Label
3 Input Voltage Jumper Link
Move jumper link to match input voltage.

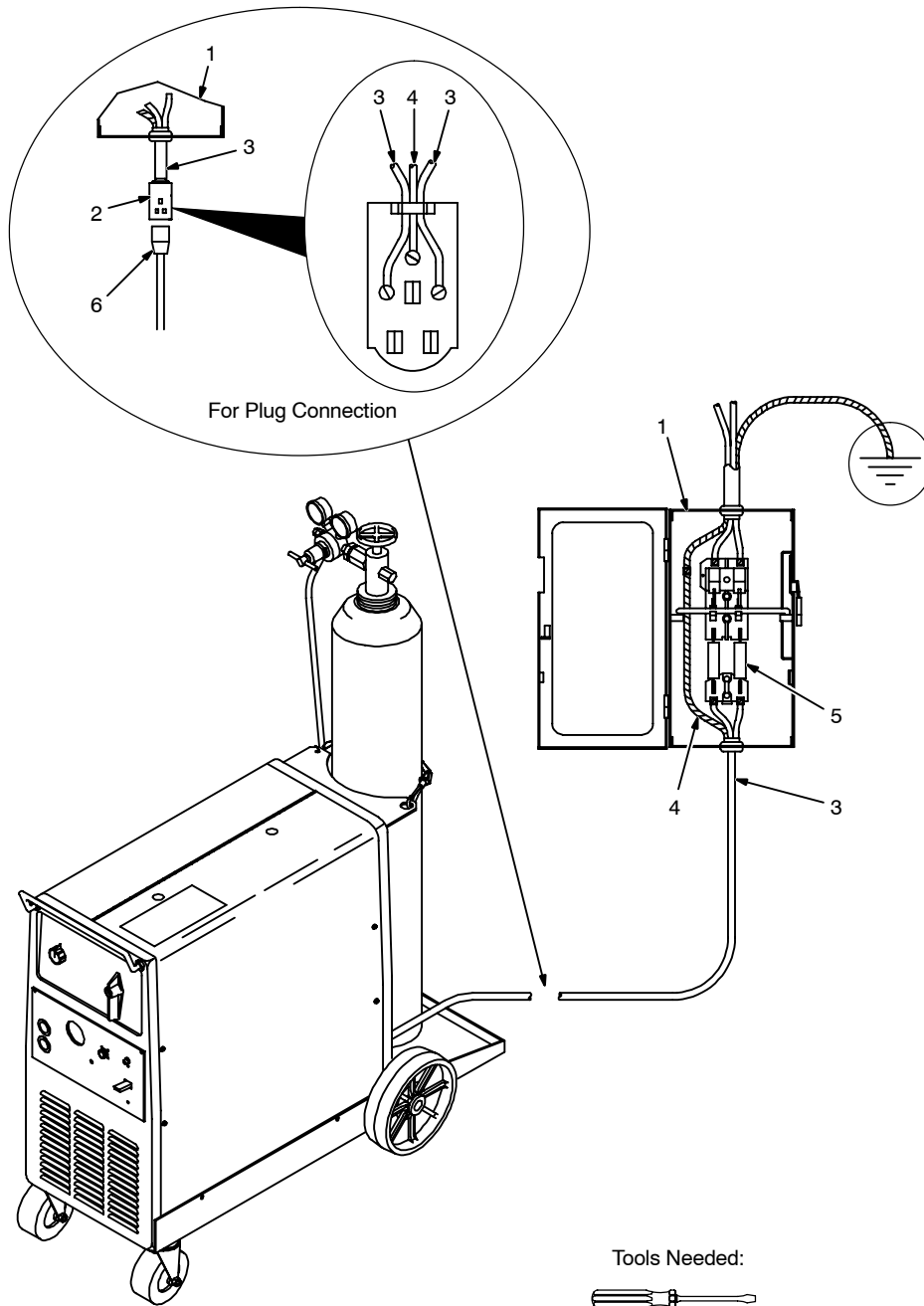
Close and secure access door.
Close side door.

Tools Needed:

Ref. ST-801 100-B

3-7. Connecting Input Power



Have only qualified persons make this installation.

- 1 Line Disconnect Device Of Proper Rating
- 2 230 Volts AC Wall Receptacle
- 3 Input Conductors
- 4 Grounding Conductor

Select size and length using 3-5. Conductor rating must comply with national, state, and local electrical codes.

Install and connect grounding conductor and input conductors in conduit or equivalent between wall receptacle and deenergized line disconnect device.

Connect grounding conductor first, then line input conductors.

Be sure grounding conductor goes to an earth ground.

- 5 Overcurrent Protection

Select type and size using 3-5. Install into deenergized line disconnect device (fused disconnect switch shown).

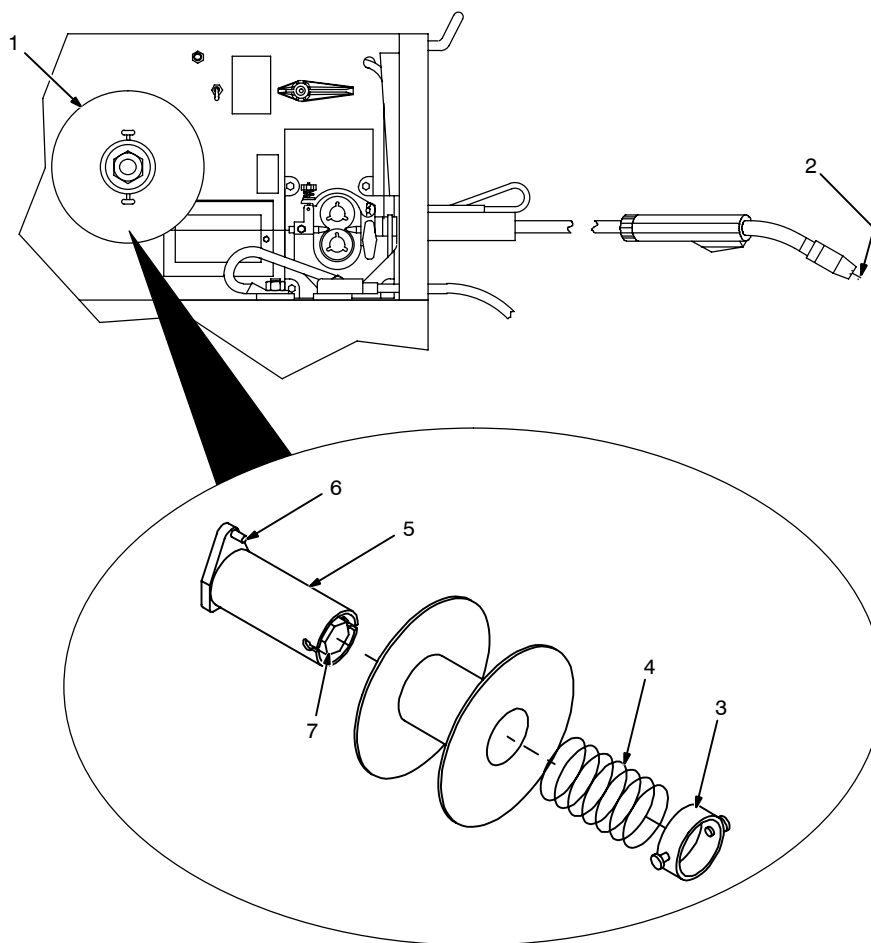
- 6 Input Power Plug

Turn off unit Power switch, and connect plug to wall receptacle.

Tools Needed:



3-8. Installing Wire Spool And Adjusting Hub Tension



- 1 Wire Spool
- 2 Gun Contact Tip

If necessary, cut welding wire off at contact tip, and retract wire onto spool and secure.

- 3 Retaining Ring
- 4 Compression Spring

Remove ring and pull off spool. Compression spring is used with 8 in (200 mm) spools.

- 5 Hub
- 6 Hub Pin

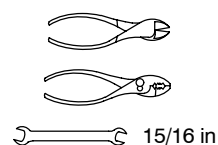
Slide spool onto hub so wire feeds off bottom. Turn spool until hub pin fits hole in back of spool. Reinstall retaining ring.

- 7 Hub Tension Nut

Grasp spool in one hand and turn while using a wrench to adjust hub tension nut. When a slight force is needed to turn spool, tension is set.

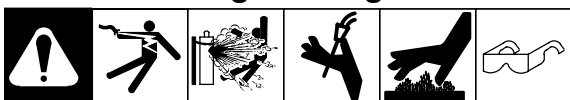
Thread welding wire (see Section 3-9). Close door.

Tools Needed:



Ref. ST-801 103-B / Ref. ST-072 573-B

3-9. Threading Welding Wire

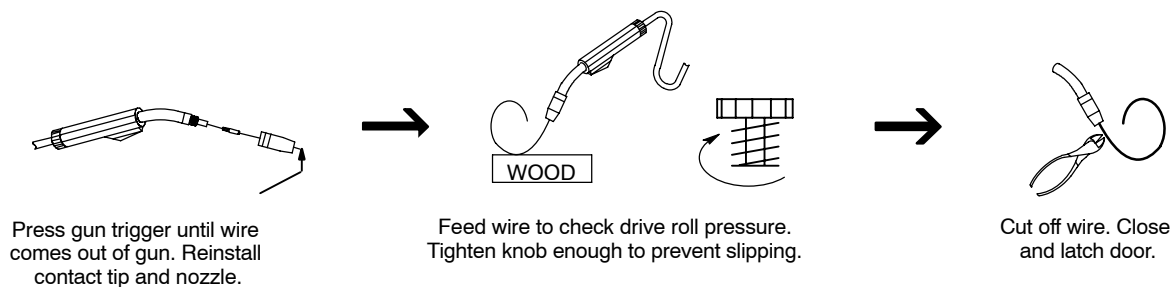
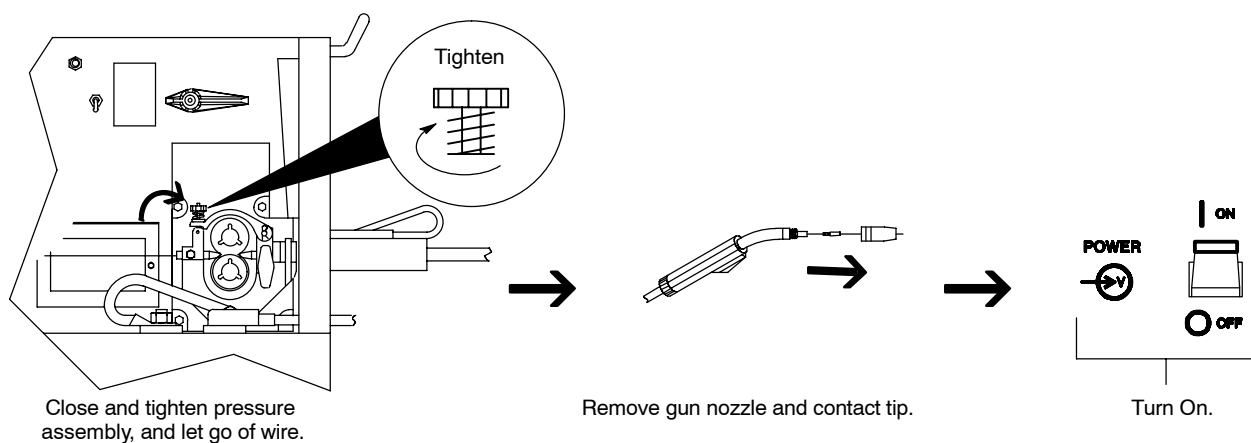
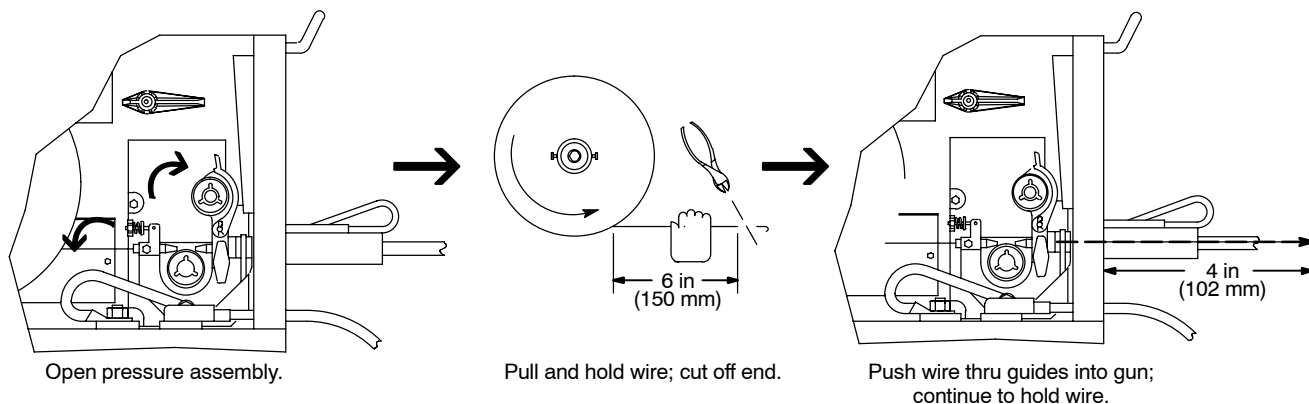
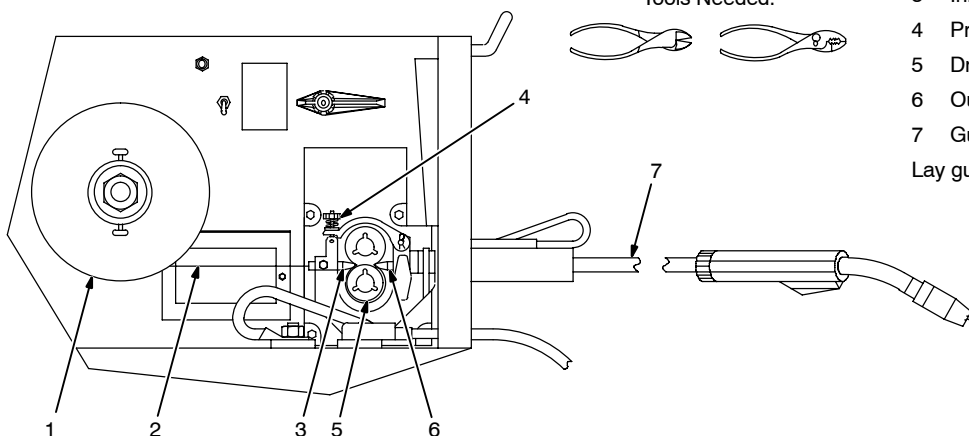


- 1 Wire Spool
- 2 Welding Wire
- 3 Inlet Wire Guide
- 4 Pressure Adjustment Knob
- 5 Drive Roll
- 6 Outlet Wire Guide
- 7 Gun Conduit Cable

Tools Needed:



Lay gun cable out straight.



SECTION 4 – OPERATION

4-1. Front Panel Controls

1 Wire Speed Control
Use control to set wire feed speed.

2 Voltage Control
Use control and Voltage Range Selector (see 4-2) to set arc voltage. Step 6 of Low range and Step 1 of High range overlap.

3 Pilot Light

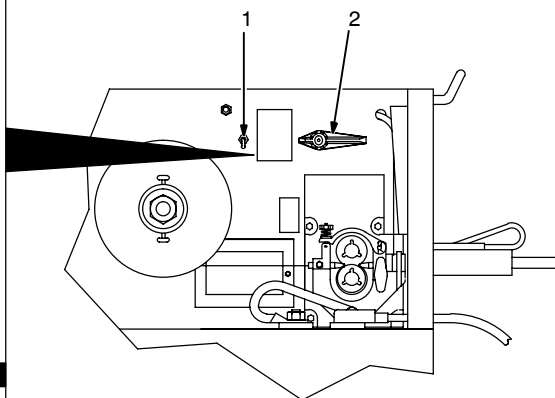
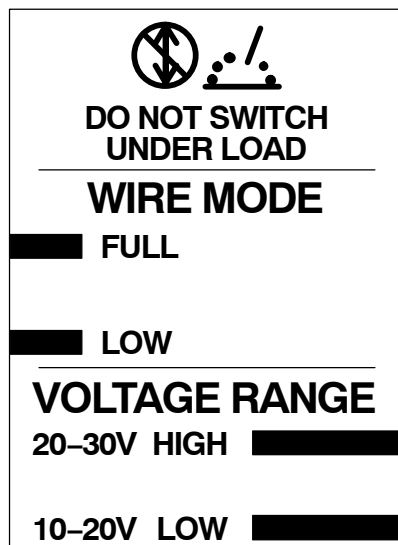
4 Power Switch
Use switch to turn unit On and Off. The pilot light comes on when unit is turned on.

5 Work Clamp
Use wire brush or sandpaper to clean metal at weld joint area.
Connect work clamp to clean, paint-free location on workpiece, as close as possible to weld area.

Tools Needed:

Ref. ST-154 622-B / ST-184 596 / Ref. ST-154 251

4-2. Center Baffle Controls



1 Wire Mode Switch

For better control of wire speed use Low position when wire speed is between 90 and 670 ipm. Use Full position when wire speed is between 150 ipm and 1030 ipm.

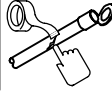
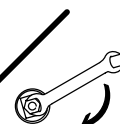
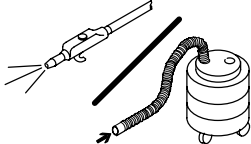
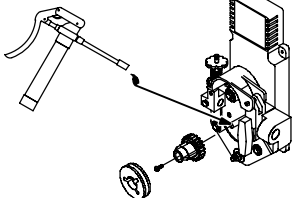
2 Voltage Range Selector

Place switch in desired position. See inside rear cover for settings.

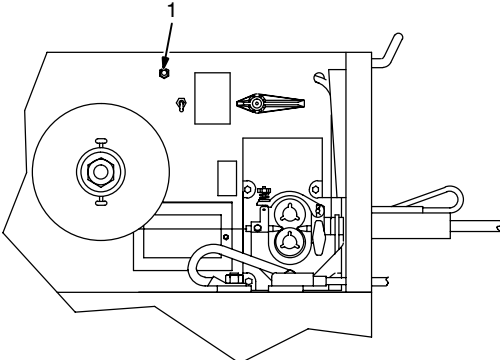
Ref. ST-801 103-B / S-171 601

SECTION 5 – MAINTENANCE & TROUBLESHOOTING

5-1. Routine Maintenance

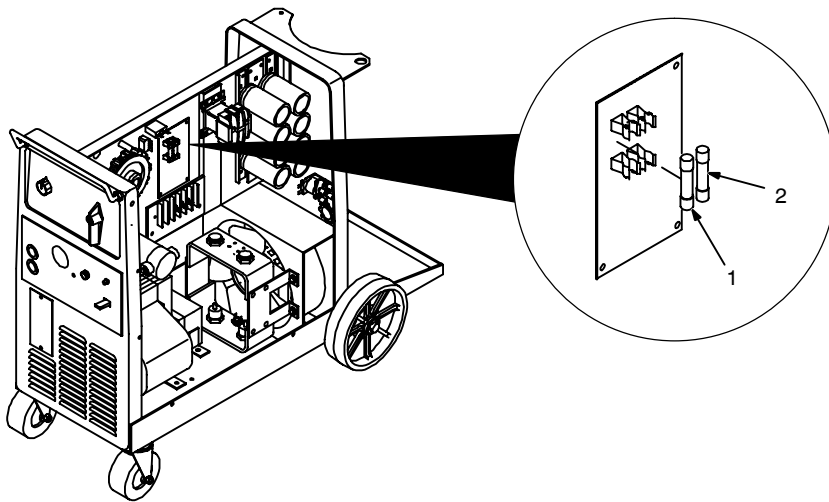
  ▲ Disconnect power before maintaining.  <i>Maintain more often during severe conditions.</i>					
 3 Months					
  Replace Damaged Or Unreadable Labels		  Repair Or Replace Cracked Cables And Cords		  Clean And Tighten Weld Terminals	
 6 Months					
 Blow Out Or Vacuum Inside			 Remove drive roll and carrier. Apply light coat of oil or grease to drive motor shaft.		

5-2. Circuit Breaker CB1

		1 Circuit Breaker CB1 If CB1 opens, wire feeding stops. Check gun liner for blockage or kinks, and check for jammed wire, binding drive gear, or misaligned drive rolls. Allow a cooling period before resetting CB1.
		

Ref. ST-801 103-B

5-3. Fuses F1 And F2



Turn Off unit and disconnect input power.

1 Fuse F1 (See Parts List For Rating)

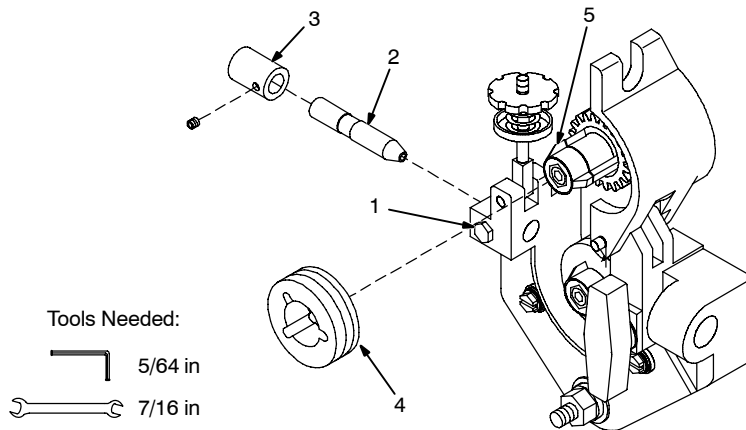
F1 protects the 115 volts ac winding of transformer T1. If F1 opens, all weld output stops and pilot light PL1 goes out.

2 Fuse F2 (See Parts List For Rating)

F2 protects the 24 volts ac winding of transformer T1. If F2 opens, all weld output stops.

Ref. ST-800 928-B

5-4. Changing Drive Rolls And Wire Inlet Guide



1 Securing Screw

2 Inlet Wire Guide

Loosen screw. Slide tip as close to drive rolls as possible without touching. Tighten screw.

3 Anti-Wear Guide

Install guide as shown.

4 Drive Roll

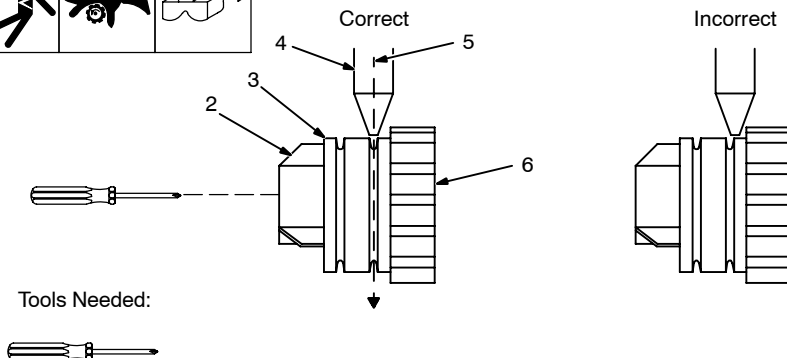
Install correct drive roll for wire size and type.

5 Drive Roll Securing Nut

Turn nut one click to secure drive roll.

ST-150 227-C

5-5. Aligning Drive Rolls And Wire Guide



View is from top of drive rolls looking down with pressure assembly open.

1 Drive Roll Securing Nut

2 Drive Roll

3 Wire Guide

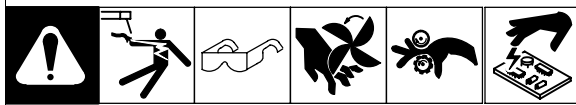
4 Welding Wire

5 Drive Gear

Insert screwdriver, and turn screw in or out until drive roll groove lines up with wire guide.

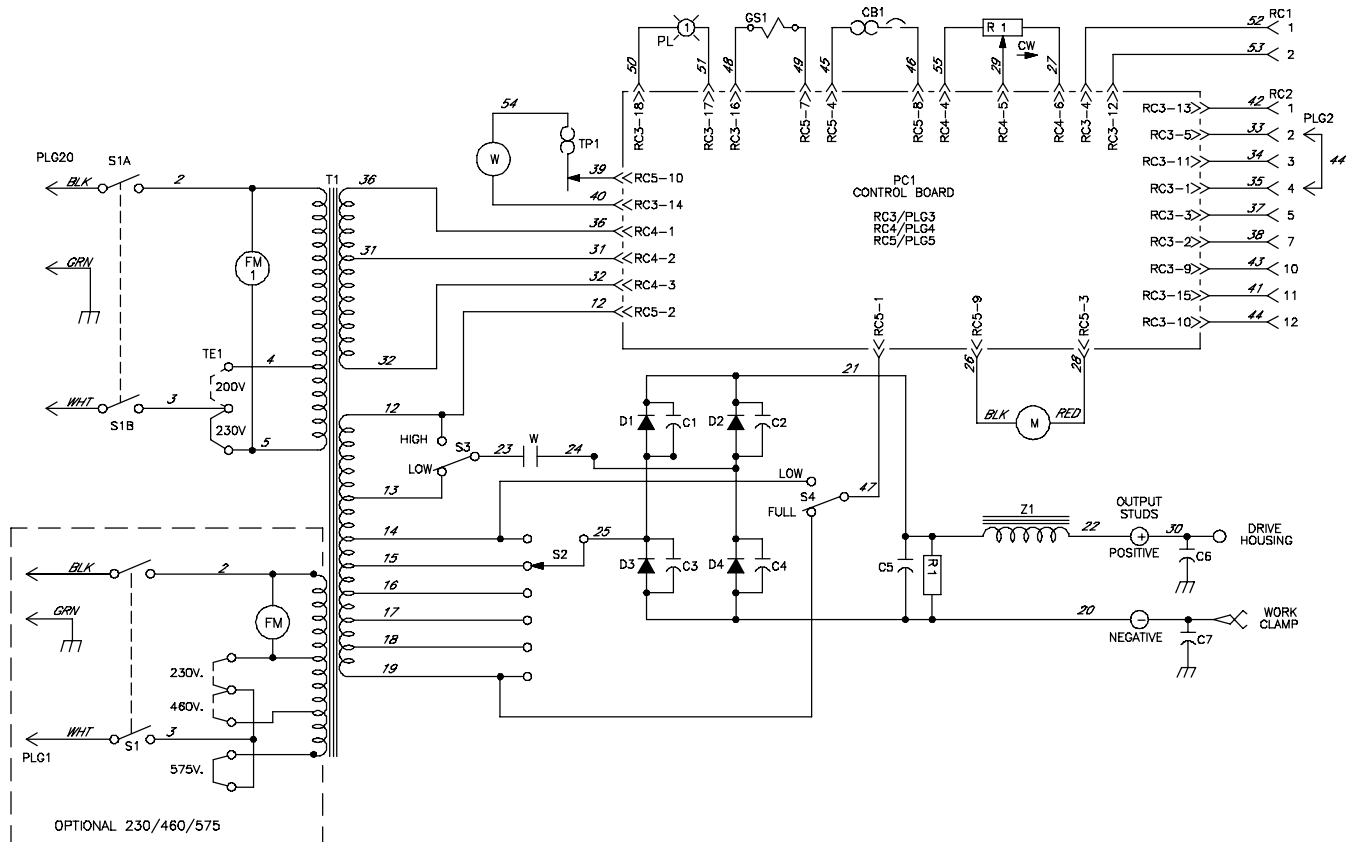
Ref. ST-801 412-A

5-6. Troubleshooting



Welding Trouble	Remedy
No weld output; wire does not feed.	Check input power connections (see Section 3-7).
	Reset circuit breaker CB1 (see Section 5-2).
	Replace fuse F1 and/or F2 (see Section 5-3).
	Replace building line fuse or reset circuit breaker if open (see Section 3-7).
	Secure gun trigger plug in receptacle or repair leads (see Section 3-4).
	Thermostat TP1 open (overheating). Allow fan to run; the thermostat will close when the unit has cooled (see Section 2-2).
No weld output; wire feeds.	Connect work clamp to get good metal to metal contact.
Low weld output.	Connect unit to proper input voltage or check for low line voltage (see Section 3-7).
Wire Drive/Gun Trouble	Remedy
Electrode wire feeding stops during welding.	Straighten gun cable and/or replace damaged parts.
	Adjust drive roll pressure (see Section 3-9).
	Readjust hub tension (see Section 3-8).
	Clean or replace wire inlet guide or liner if dirty or plugged (see Section 5-4).
	Replace drive rolls if worn or slipping (see Section 5-4).
	Secure gun trigger plug in receptacle or repair leads (see Section 3-4).
	Check and replace F1 and/or F2 (see Section 5-3).
	Check and clear any restrictions at drive assembly and liner (see Section 5-3).
	Have nearest Factory Authorized Service Agent check drive motor.
	Check relay CR1, and replace if necessary.

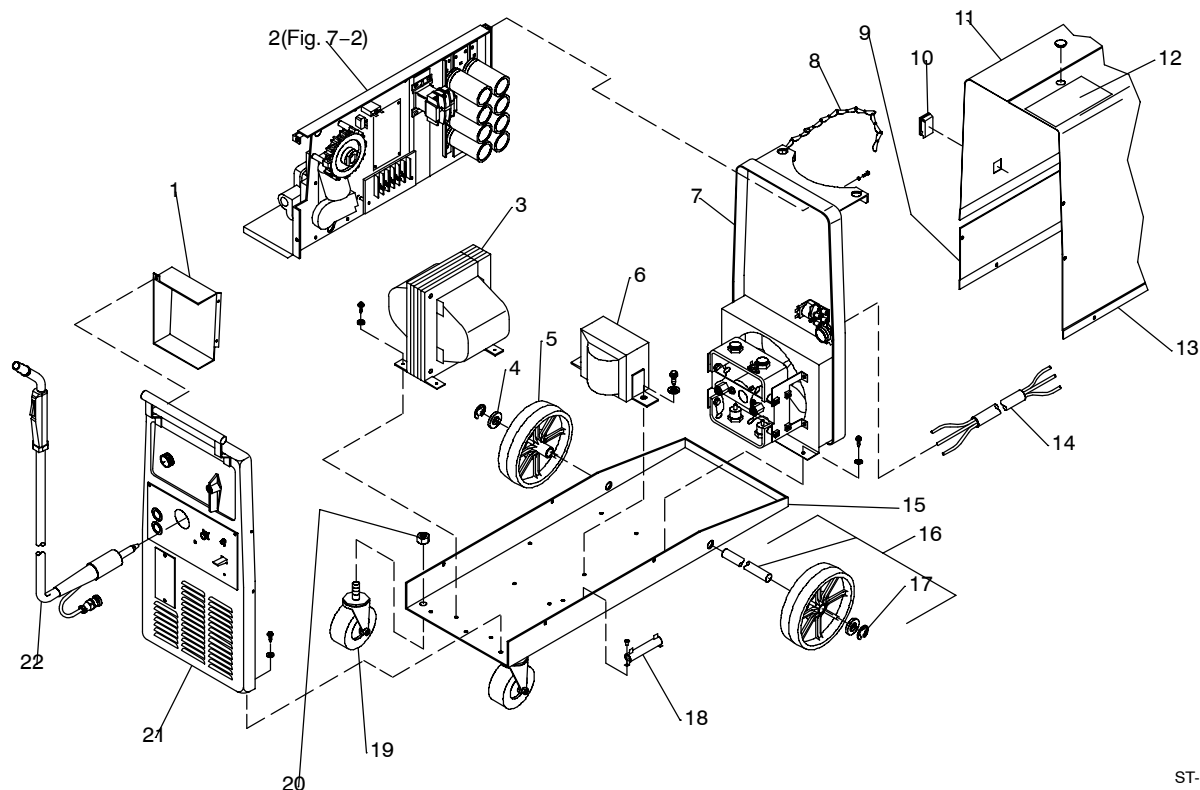
SECTION 6 – ELECTRICAL DIAGRAM



SB-173 544-E

Figure 6-1. Circuit Diagram For Welding Power Source

SECTION 7 – PARTS LIST



ST-155 610-E

Figure 7-1. Main Assembly

NOTE: All items indented by a dot(s) are included with the item listed directly above.

Item No.	Part No.	Description	Item No.	Part No.	Description	Item No.	Part No.	Description
1	146 168	Enclosure Panel		009 970	· Rectifier Bracket		153 197	· Selector Switch
	083 526	Housing Rcpt & Sockets		143 810	· Rear Panel		148 956	· Switch Handle
	072 802	Housing Plug & Pins		169 654	· Tank Bracket		175 060	· Front Panel
2	Fig 7-2	Baffle w/Cmpts		044 426	· Cable Clamp		155 418	· Front Control Panel
3	171 658	Transformer, 200/230	8	602 387	Cylinder Chain		184 596	· Control Plate
4	602 250	Washer	9	146 165	Side Panel, LH		174 839	· Nameplate
5	186 758	Wheel	10	089 899	Latch		144 127	· Cover, module opening
6	171 213	Stabilizer	11	146 167	Side Panel		057 357	· Bushing, 1.125mtg
7		Rear Panel w/Cmpts	12	134 464	Warning Label		143 974	· Handle
	148 808	· Fan Motor	13	+170 513	Wrapper	22		See gun Owner's Manual for information and warranty
	150 783	· Fan Blade	14	188 911	Cord Set		192 121	Regulator/Flowmeter
	049 399	· Speed Nut	15	146 161	Base		144 108	Hose, 5ft
	116 996	· Gas Valve	16	135 390	Axle		600 318	Weld Cable
	605 227	· Nylon Nut, .750	17	121 614	Retaining Ring		130 750	Ground Clamp
	134 834	· Hose	18	091 685	Resistor			
	149 332	· Hose Clamp		605 741	Clip			
	152 742	· Rectifier	19	008 999	Caster			
	048 420	· Capacitor	20	193 632	Jam Nut			
	037 957	· Diode, RP	21		Front Panel w/Cmpts			
	037 956	· Diode, SP		160 775	· Light			
	605 886	· Washer, .750		035 897	· Potentiometer			
	605 884	· Half Nut, .750-16		097 924	· Knob			
	171 600	· Thermostat, NC		048 282	· Receptacle w/Sockets			
	026 947	· Stand-Off		079 534	· Terminal, female			
	152 862	· Grommet		128 755	· Switch, DPST			

+When ordering a component originally displaying a precautionary label, the label should also be ordered.

Be sure to provide Model and Serial Number when ordering replacement parts.

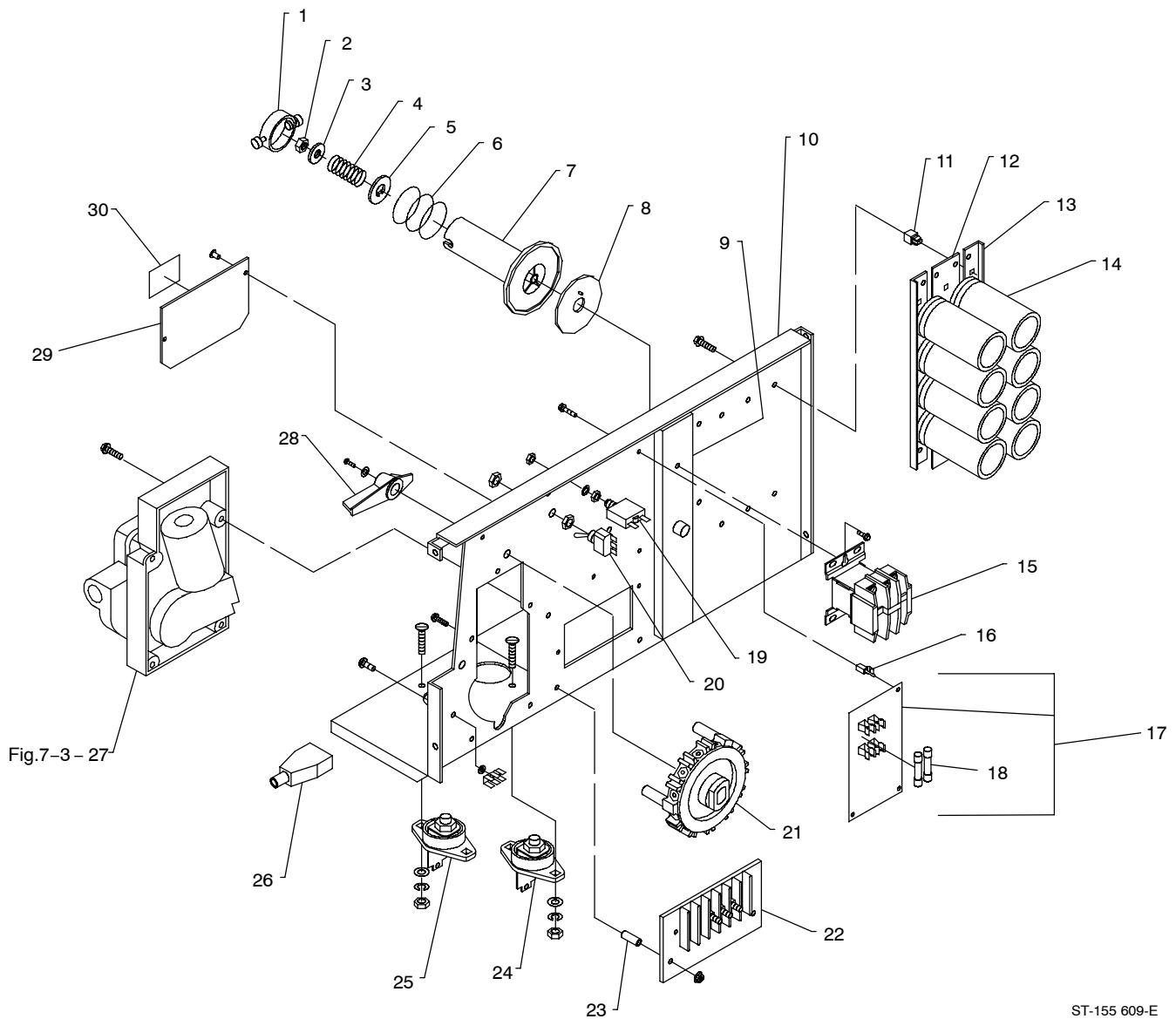


Figure 7-2. Baffle w/Components (Fig 7-1 Item 2)

NOTE: All items indented by a dot(s) are included with the item listed directly above.

Item No.	Part No.	Description	Item No.	Part No.	Description	Item No.	Part No.	Description
1	058 427	Retaining Ring	15	186 355	Contactors		038 618	· Link
2	085 980	Nut		114 786	Link	23	010 199	Tubing
3	605 941	Flat Washer	16	134 201	PC Card Stand-Off	24	039 047	Output Terminal, red
4	186 437	Spring, .845 OD	17	173 002	Motor Speed Control Card	25	039 046	Output Terminal, black
5	057 971	Keyed Washer	18	*012 658	· Fuse, mintr gl slo-blo 2A 125V		123 750	Capacitor
6	057 745	Spring, 2.430 OD	18	*073 426	· Fuse, mintr gl slo-blo 5A 125V	26	071 971	Cover
7	186 435	Hub, spool		165 896	Connector & Sockets	27	174 861	Drive Assembly, (Fig 7-3)
8	186 436	Hub, spool		135 558	Connector & Sockets	28	148 956	Switch Handle
9	177 307	Support Reel		165 745	Connector & Sockets	29	144 933	Access Door
10	174 812	Baffle	19	083 431	Circuit Breaker	30	021 469	Danger Label
	186 998	Kit Capacitor	20	011 609	Toggle Switch, SPDT			
11	083 147	Grommet	21	171 610	Selector Switch			
12	082 902	Strip, mtg center		186 058	COVER, dust range switch			
13	185 643	Strip, mtg LH & RH	22	189 452	Terminal Assembly, pri 2V			
14	184 584	Capacitor						
	185 642	Insulator						

◆ OPTIONAL
*Recommended Spare Parts
Be sure to provide Model and Serial Number when ordering replacement parts.

**See Table 6-1
Drive Roll & Wire Guide Kits.**

 Hardware is common and not available unless listed.

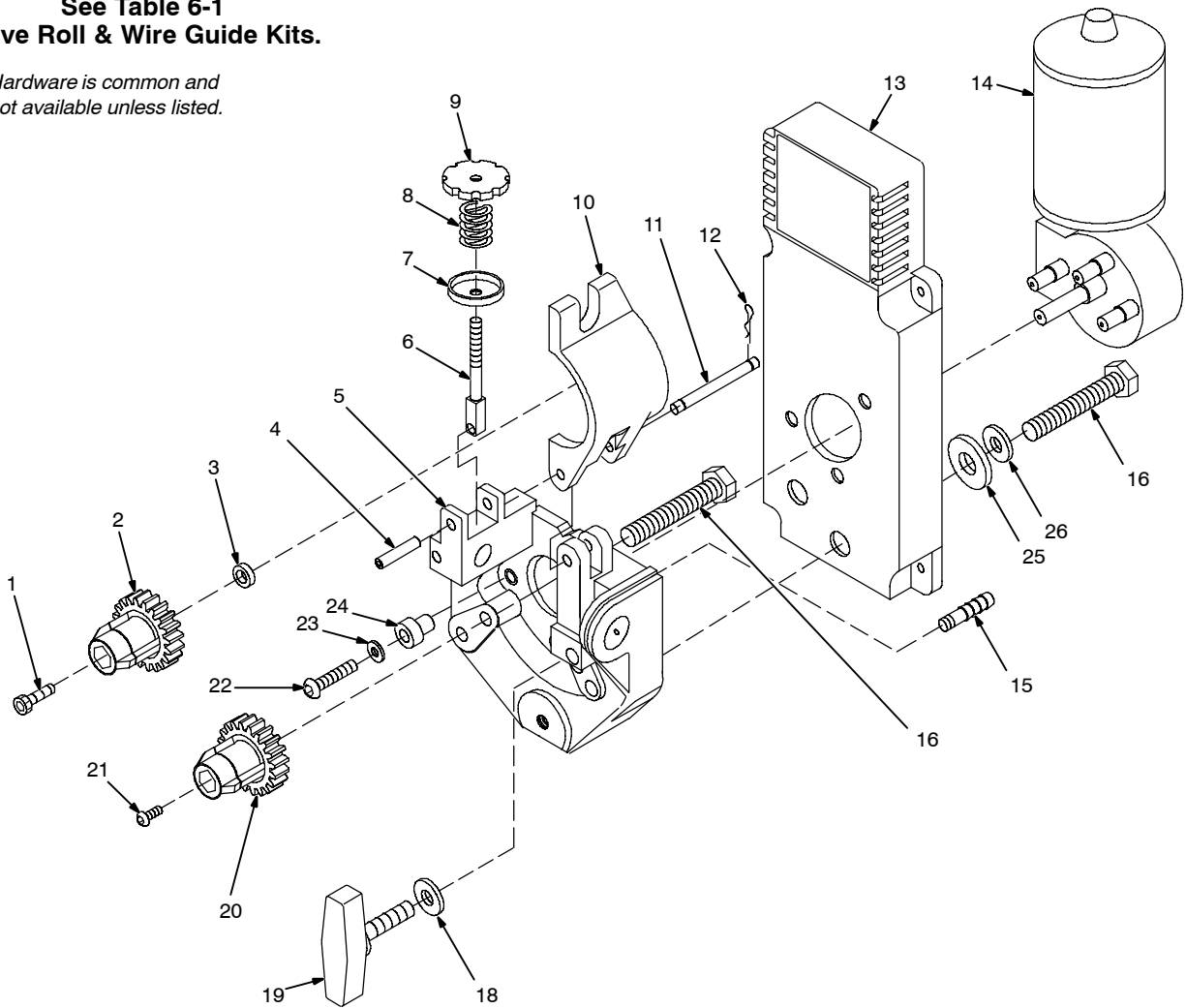


Figure 7-3. Wire Drive And Gears (Fig 7-2 Item 27)

ST-148 529-H

Item No.	Part No.	Description	Item No.	Part No.	Description	Item No.	Part No.	Description
1	602 009	Screw, .250-20 x 1.25	14	173 435	Motor (consisting of	24	173 620	Bushing
2	172 075	Carrier, drive roll		193 633	Key, woodruff .118 x .380	25	602 243	WASHER, flat .438 x 1.00
3	166 072	Spacer		193 634	Washer, wave	26	602 213	WASHER, lock .380 x .683
4	010 224	Spring Pin		193 635	Ring, rtng ext		056 192	Wire Guide, .023/.025 & .030-.035
5	182 788	Housing, adapter	15	079 633	Fitting, hose 3/16tbg		♦056 193	Wire Guide, .045
6	085 242	Fastener	16	601 966	Screw, .375–16 x 1.25		045 127	Guide, anti-wear
7	085 244	Cupped Washer	18	604 538	Washer, flat		053 700	Roll, drive V-groove .035
8	010 231	Spring	19	124 778	Knob			
9	085 243	Knob	20	173 619	Carrier, drive roll			♦OPTIONAL
10	166 071	Pressure Lever	21	174 609	Screw, M 4–.7 x 12			*Recommended Spare Parts
11	079 634	Hinge Pin	22	174 610	Screw, M 6–1.0 x 20			Be sure to provide Model and Serial Number
12	151 828	Cotter Hair Pin	23	192 029	WASHER, flat .250 x .437			when ordering replacement parts.
13	173 616	Cover, motor						

♦ OPTIONAL

*Recommended Spare Parts

Be sure to provide Model and Serial Number when ordering replacement parts.

Table 7-1. Drive Roll And Wire Guide Kits

► **IMPORTANT:** *Base selection of drive rolls upon the following recommended usages:*

1. *V-Grooved rolls for hard wire.*
2. *U- Grooved rolls for soft and soft shelled cored wires.*
3. *U-Cogged rolls for extremely soft shelled wires (usually hard surfacing types).*
4. *V-Knurled rolls for hard shelled cored wires.*
5. *Drive roll types may be mixed to suit particular requirements (example: V-Knurled roll in combination with U-Grooved).*

Wire Diameter			Kit No.	Drive Roll		Inlet Wire Guide
Fraction	Decimal	Metric		Part No.	Type	
.023/.025 in.	.023/.025 in.	0.6 mm	087 131	087 130	V-Grooved	056 192
.030 in.	.030 in.	0.8 mm	079 594	053 695	V-Grooved	056 192
.035 in.	.035 in.	0.9 mm	079 595	053 700	V-Grooved	056 192
.045 in.	.045 in.	1.2 mm	079 596	053 697	V-Grooved	056 193

Ref. S-0026-B/7-91

Warranty

Effective January 1, 1999
(Equipment with a serial number preface of "KK" or newer)

This limited warranty supersedes all previous manufacturers warranties and is exclusive with no other guarantees or warranties expressed or implied.

LIMITED WARRANTY – Subject to the terms and conditions below, warrants to its original retail purchaser that new equipment sold after the effective date of this limited warranty is free of defects in material and workmanship at the time it is shipped from factory. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.

Within the warranty periods listed below, manufacturer will repair or replace any warranted parts or components that fail due to such defects in material or workmanship. Manufacturer must be notified in writing within thirty (30) days of such defect or failure, at which time manufacturer will provide instructions on the warranty claim procedures to be followed.

Manufacturer shall honor warranty claims on warranted equipment listed below in the event of such a failure within the warranty time periods. All warranty time periods start on the date that the equipment was delivered to the original retail purchaser, or one year after the equipment is sent to the distributor.

1. 5 Years Parts – 3 Years Labor
 - * Original main power rectifiers
2. 3 Years — Parts and Labor
 - * Transformer/Rectifier Power Sources
 - * Plasma Arc Cutting Power Sources
 - * Semi-Automatic and Automatic Wire Feeders
 - * Engine Driven Welding Generators
(NOTE: Engines are warranted separately by the engine manufacturer.)
3. 1 Year — Parts and Labor
 - * Motor Driven Guns (w/exception of Spoolmate 185)
 - * Process Controllers
 - * Positioners and Controllers
 - * Automatic Motion Devices
 - * Robots
 - * Water Coolant Systems
 - * HF Units
 - * Grids
 - * Spot Welders
 - * Load Banks
 - * SDX Transformers
 - * Running Gear/Trailers
 - * Field Options
(NOTE: Field options are covered under the limited warranty for the remaining warranty period of the product they are installed in, or for a minimum of one year — whichever is greater.)
4. 6 Months — Batteries
5. 90 Days — Parts and Labor
 - * MIG Guns/TIG Torches
 - * Plasma Cutting Torches
 - * Remote Controls
 - * Accessory Kits
 - * Replacement Parts
 - * Spoolmate 185

Limited Warranty shall not apply to:

1. Items furnished by manufacturer, but manufactured by others, such as engines or trade accessories. These items are covered by the manufacturer's warranty, if any.
2. Consumable components; such as contact tips, cutting nozzles, contactors, relays, brushes, slip rings, or parts that fail due to normal wear.
3. Equipment that has been modified by any party other than manufacturer, or equipment that has been improperly installed, improperly operated or misused based upon industry standards, or equipment which has not had reasonable and necessary maintenance, or equipment which has been used for operation outside of the specifications for the equipment.

MANUFACTURER'S PRODUCTS ARE INTENDED FOR PURCHASE AND USE BY COMMERCIAL/INDUSTRIAL USERS AND PERSONS TRAINED AND EXPERIENCED IN THE USE AND MAINTENANCE OF WELDING EQUIPMENT.

In the event of a warranty claim covered by this warranty, the exclusive remedies shall be, at manufacturers option: (1) repair; or (2) replacement; or, where authorized in writing by manufacturer in appropriate cases, (3) the reasonable cost of repair or replacement at an authorized service station; or (4) payment of or credit for the purchase price (less reasonable depreciation based upon actual use) upon return of the goods at customer's risk and expense. manufacturer's option of repair or replacement will be F.O.B., Factory at Appleton, Wisconsin, or F.O.B. at an authorized service facility as determined by manufacturer. Therefore no compensation or reimbursement for transportation costs of any kind will be allowed.

TO THE EXTENT PERMITTED BY LAW, THE REMEDIES PROVIDED HEREIN ARE THE SOLE AND EXCLUSIVE REMEDIES. IN NO EVENT SHALL MANUFACTURER BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING LOSS OF PROFIT), WHETHER BASED ON CONTRACT, TORT OR ANY OTHER LEGAL THEORY.

ANY EXPRESS WARRANTY NOT PROVIDED HEREIN AND ANY IMPLIED WARRANTY, GUARANTY OR REPRESENTATION AS TO PERFORMANCE, AND ANY REMEDY FOR BREACH OF CONTRACT TORT OR ANY OTHER LEGAL THEORY WHICH, BUT FOR THIS PROVISION, MIGHT ARISE BY IMPLICATION, OPERATION OF LAW, CUSTOM OF TRADE OR COURSE OF DEALING, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE, WITH RESPECT TO ANY AND ALL EQUIPMENT FURNISHED BY MANUFACTURER IS EXCLUDED AND DISCLAIMED BY MANUFACTURER.

Some states in the U.S.A. do not allow limitations of how long an implied warranty lasts, or the exclusion of incidental, indirect, special or consequential damages, so the above limitation or exclusion may not apply to you. This warranty provides specific legal rights, and other rights may be available, but may vary from state to state.

In Canada, legislation in some provinces provides for certain additional warranties or remedies other than as stated herein, and to the extent that they may not be waived, the limitations and exclusions set out above may not apply. This Limited Warranty provides specific legal rights, and other rights may be available, but may vary from province to province.



Owner's Record

Please complete and retain with your personal records.

Model Name

Serial/Style Number

Purchase Date

(Date which equipment was delivered to original customer.)

Distributor

Address

City

State

Zip



Resources Available

Always provide Model Name and Serial/Style Number.

Contact your Distributor for:

Welding Supplies and Consumables

Options and Accessories

Personal Safety Equipment

Service and Repair

Replacement Parts

Owner's Manuals

Circuit Diagrams

Contact the Delivering Carrier for:

File a claim for loss or damage during shipment.

For assistance in filing or settling claims, contact your distributor and/or equipment manufacturer's Transportation Department.